

# **Evaluation of Legacy (SP5075) For Post Emergence Control of Annual Bluegrass In Overseeded Bermudagrass Turf: Weed Control and Turfgrass Performance**

*D.M. Kopec, J. Gilbert, M Pessaraki, and S. Nolan*

**University of Arizona**

## ***Abstract***

*SP 5075 (now commercially available as “Legacy” was evaluated as a post emergence herbicide on both non-overseeded and overseeded Tifway bermudagrass turf. From October 2007, to April 2008, monthly application rates of Legacy (alone) were applied at SP5075 @ 14.7 oz/product/acre, 22.1 oz/product/acre and at 29.4 oz/product/acre, along with SP5075 @ 14.7 oz/product/acre & Cutless @ 8.0 oz/product/acre, Primo Maxx alone at 22 oz/product/acre, and Cutless alone at 16 oz/product/acre. Chemical product applications did not affect emergence and treatments containing the formulated product of Legacy showed no inhibition. All treatments had enhanced turfgrass color over the UTC (untreated control) throughout all eight months of the test. The high rate of Legacy exhibited a brief decrease in density, color and quality form late November and into December. The high rate of Legacy produced the least amount of Poa annua cover, the greatest unmowed height suppression, the greatest seed head suppression and vegetative weed control of all treatments, and produced the least discontinuous surface. Cutless alone produced similar turf and Poa annua effects as the tank mix of Legacy at the low rate plus the inclusion of Cutless at 8.0 oz /prod/acre. The high rate of Legacy did not eliminate flowering, but postponed flowering of Poa annua well past the flushes of the UTC, noting that there was much less Poa annua present from this treatment when overseeded. Primo Maxx alone caused minimal seed head suppression of Poa annua, and minimal weed control of total Poa cover and seed heads. Best estimates of transition occurred on 30 June 2008, were treated overseeded turfs ranged from 58% to 80% bermudagrass cover, with 80% cover for Primo alone, with Cutless alone having 58% bermudagrass (UTC = 84%). Since the medium rate of Legacy produced similar Poa activity effects with better turf quality after overseeding (but then decreased in Poa activity afterwards), applications of the medium rate from initial overseed followed by*

*subsequent applications at the high rate starting in January should be investigated for economic, turf performance and weed control performance.*

## **Introduction**

Annual bluegrass (*Poa annua*), hereafter as “AB”, is the most prevalent and ubiquitous grassy weed in all of turf management. As a winter annual weed on bermudagrass turf, it is easily controlled with pre-emergence herbicides applied late summer or early fall. When fall overseeding is required however, there are limited options for pre-emergence control of AB. Options include Rubigan (fenarimol) applied in either two or three split applications, or Barricade (prodiamine) applied at either 6 or so weeks before overseeding.

Other pre-emergence products when used in this capacity either have too much residual against ryegrass for emergence, or not enough for AB pre-emergence control.

Rubigan is costly, and Barricade can cause severe stunting of the ryegrass if not applied with great care.

Post emergence control/suppression of AB in overseeded turfs includes the use of Prograss (ethofumesate), which must be applied when the bermudagrass is fully dormant. Alternatives include the use of TGR or Limit (paclobutrazole), for growth suppression. Seed head control is obtainable to various degrees by applying tank mixes of Proxy (ethepon) and Primo PGR (trixepac-ethyl). Application of either alone have a diminished response for seed head suppression and vegetative suppression as well. Cutless (flurprimidol) has been used sporadically for vegetative suppression, with mixed results. There is always interest in new products or product/management combinations to control or strongly suppress AB, which promotes discontinuity of the turf surface, and when in the full flower phase in the spring, is just a physical and aesthetic nuisance to all golf and sports turf managers. With this in mind, a season long post emergence field trial was conducted to evaluate a proprietary developed pre-packaged mix of Primo and PGR (now commercially available as Legacy) on bermudagrass overseeded with turf-type perennial ryegrass.

## **Materials and Methods**

A golf course approximately 35 miles south of Tucson Arizona with a known history of producing large and uniform stands of AB was used as the test site. The turf was overseeded on October 1, 2007 at the rate of 625 lbs/pls/acre with “FLASH II” turf-type perennial ryegrass. The turf was mowed at 1.25 inches from October 15 to July 1, 2008, when the turf was lowered to .50 inches for a forced mechanical transition. Starting in the last week of

October, seven herbicide treatments were applied monthly from October 2007 until May 2008, which included the entire AB season ending with terminal flowering and vegetative necrosis.

The treatments were as follows:

- 1 = UTC (untreated control)
- 2 = SP5075 @ 14.7 oz/product/acre (low rate)
- 3 = SP5075 @ 22.1 oz/product/acre (medium rate)
- 4 = SP5075 @ 29.4 oz/product/acre (high rate)
- 5 = SP5075 @ 14.7 oz/product/acre & Cutless @ 8.0 oz/product/acre
- 6 = Primo Maxx @ 22 oz/product/acre
- 7 = Cutless @ 16 oz/product/acre

Each turfgrass plot had both a non-overseeded and an overseeded half, to which the “treatment” was applied to both halves simultaneously. This was conducted to investigate (1) the intensity of effect of the treatments on AB clone, to (2) determine the effect of the treatments on overseeded turf and to (3) ascertain the effect of overseeding.

Treatments were applied at the above product / rates on 30 October, 27 Nov, 27 Dec 2008, 29 Jan, 27 Feb, 6 March, and 17 April 2008. A final application was not possible due to extended wind conditions on three different successive application attempts in May.

Since the intended use of these treatments were to assess efficacy when used on overseeded turf, the interaction of chemical treatment x overseed status is not of prime importance, rather the performance on overseed turf is of the greatest value. Therefore, the data were analyzed as two separate tests; for (1) overseeded and for (2) non-overseeded turfs. All treatments appeared five times in a RCB field design.

*Data collected for general turfgrass performance* included visual NTEP scores for turfgrass, color, quality, and density, and when applicable, visual discontinuity (see Results and Discussion) when AB expression was prevalent. Plot composition scores (% of the entire plot composition as bermudagrass, ryegrass, straw) were assigned after overseeding, and again during the spring transition. Data collection of relevant variables were dependant in part on a “as appearance basis” between overseed and non-overseeded plots, since the appearance of AB was effected by overseeding, and turf attributes of AB alone (in non-overseed plots) are of little importance.

*For AB growth responses*, visual flower head suppression scores, unmowed height suppression (of AB), and visual stress scores (to AB) were assigned on applicable dates. For infestation and flowering levels, data were recorded first as the visible amount of AB present (0% to 100% of the plot surface), as well as the percent of the existing total AB amount that is in flower. The latter was calculated as [% plot surface flowering/%plot Poa cover] x 100.

The % AB plot cover and % AB in flower were then used for percent weed control and percent flower control using those respective values in the formula  $1 - (\text{treated}/\text{UTC}) \times 100$ . The mean of the five UTC was used for the computation above.

All data were subjected to the analysis of variance technique using SAS software. Since three of the six treatments were not structured in a graduated rate series, LSD values were calculated as the treatment mean separation statistic only when the treatment mean squares were significant at  $P=0.05$ , or less. For discussion purposes, significant F ratios for the treatment mean squares are discussed in the text as for any effect being “related to treatments”, thus indicating statistical significance.

## **Results and Discussion**

### Turf Attributes

#### Establishment of Overseed:

The turf was overseeded on October 1, 2007. The percent ryegrass cover ranged from 92% to 97%, and was not related to treatments on 13 November (2 weeks after the first treatments were applied) (Table 1).

On 27 November, treatments did have a significant effect whereby the single application of Cutless alone (76%) was similar to that of the UTC (76%). The low rate of Legacy had the highest ryegrass cover (89%) on November 27 compared to the other two rates of Legacy.

Likewise, the percent bermudagrass cover on overseeded turf was not affected by treatments on 13 November, but was on 27 November (Table 2). The medium rate of Legacy had 11% bermudagrass (82% ryegrass) while Cutless @ 16 oz/product/acre also had higher than average amounts of bermudagrass (12%) (Table 2) and 76% ryegrass, (Table 1). The amount of bermudagrass on non-overseeded turfs was not affected by treatments, and ranged from 16-30% on 13 November (six weeks after overseed) and from 5-13% on 27 November (7 weeks after overseed) (Table 2).

For overseeded turfs, density was not affected by treatments on 13 November, but was on 27 November (Table 3). On 13 November, the high rate of Legacy had an overall quality score of 7.0, with the UTC having a score of 8.0, resulting in the mean square for “treatment” to be statistically significant (Table 5). For density, treatments had an effect as the high rate of Legacy (29.4 oz/product/acre) had the thinnest appearing turf (5.6) on 27 Nov, 2007 (Table 3).

Turfgrass color was enhanced by all treatments (PGR Effect) versus that of the control (UTC=5.6) on 27 November 2007 (Table 4). While turfgrass quality was acceptable for the UTC on 11 Nov, 2007 (mean = 6.0), the Primo

Maxx alone at 22 oz/product/acre and SP5075 (Legacy) at the low rate of 14.7 oz/product/acre had slightly greater mean scores of 7.0 (Table 5).

*Established Turf Performance:*

This discussion involves the turfgrass performance after the previously discussed establishment period, and covers treatment performance from 5 December 2007, to June 10, 2008.

For turfgrass color of overseeded turf, individual treatment means ranged from 5.0 (medium light green) to 8.2 (dark green) from 5 December 2007, to June 10, 2008. The UTC on nearly all evaluation dates had normal color (5.2 to 5.8), only becoming darker after an elevated nitrogen application was made on 1 July 2008. Throughout the “regular” season, the role response of Legacy alone showed that the middle rate (22.1 oz/product/acre) had ranged higher in color than the other rates during the coldest weeks of December and early January, while after that, increases in color were essentially positive and linear with applied rate of Legacy (Table 4). The applied rate of Primo Maxx as a sole product @ 22 oz/product/acre did not always produce the darkest turfs. From 5 February to 10 June 2008, Cutless alone at 16 oz/product/acre produced numerically darker mean rank color scores in comparison to Primo alone, on five of eight evaluations, noting that their mean scores were statistically significant from each other on 21 May and 10 June 2008, as Cutless had mean color scores of 8.2 and 7.8, vs. 6.6 and 6.6 for Primo, respectively (Table 4).

The tank mix of Legacy plus Cutless produced very good color performance, and had greater mean color scores than either Primo or Cutless alone on 5 and 16 February (Table 4). Turfgrass density was not affected by treatments from 5 December to 10 June 2008 on overseeded turfs (Table 4).

Among overseeded turf, the treatments had impacted overall quality of the overseeded turfs on four of eight evaluation dates from 5 February to 10 June, 2008 (Table 5). In general, the UTC tended to rank lowest in quality, with Cutless alone at 16 oz/product/acre producing quality scores of less than 6.0 on four occasions after January 2008 (Table 5), which was not related to *Poa* infestation level (Table 9). Among overseeded Legacy plots, the high rate of 29.4 oz/product/acre had nominal overall quality scores of 5.0 on both 5 December and 2 January during this cold temperature period (Table 5). This was reflected by having a lower shoot density, as this treatment had mean shoot density values of 5.0 on both 5 December and 2 January 2008 (Table 4). Once warmer daytime temperatures developed in early February, the high rate of Legacy produced ever increasing overall quality scores from 5 February until the close of test on 15 June 2008.

From 2 January to 21 May 2008, neither the tank mix or the Primo “alone” treatments tended to have numerically greater quality scores than that of Cutless alone. Cutless alone, again produced quality scores of less than 6.0 on four occasions during the full spring season (Table 5).

### Treatment Effects on AB:

AB was first visible in the non-overseeded treated turfs by 5 December, and first distinguishable from the perennial ryegrass in the overseeded turf on 5 February, 2008. The amount of *Poa annua* cover for the overseeded UTC ranged from 10 to 60% total plot cover as the season progressed from 27 Nov 2007, to 17 April 2008 (Figure 1.)

*Visible stress* scores were assigned to overseed plots on 2 January, and on five dates from 5 December to 3 May 2008 on the non-overseeded turf (Table 6). The stress to AB was a culmination of leaf twisting, stunting, loss of color and any leaf necrosis. Higher values indicate greater degree of injury using a 1-6 score (1 = no injury, 6 = severe injury). Stress was affected by treatments on overseeded turf on 2 January 2008, as the high rate of Legacy (22 oz/product/acre) produced moderate injury to the AB (3.4).

For non-overseeded turfs, the treatments caused different amount of injury from 5 December to 3 May 2008 (Table 6). This is in part due to the results that the Cutless alone treatment caused the least amount of “stress” to the AB before 17 April, by and after which, excessive flowering developed which decreased its quality and increased its “apparent stress,” because of the remaining necrotic tissue left after the delayed and heavy flowering was completed. The high values of “stress” in the UTC plots arise from the constant and early flowering which started by mid February and continued on to May 2008. The remaining “*Poa* stress injury values” for Legacy treatments showed high levels of stress as their progressive and delayed floral development periods developed, leaving necrotic leaf tissue afterwards (Table 6).

*Suppressed vegetative growth* of AB was determined by the relative height of the AB itself just prior to a mowing event, as the AB elongation rates were greater than that of the perennial ryegrass. On overseeded turfs, the affected AB height on 5 February, 16 February, and 5 March 2008, but not afterwards (Table 7). AB height suppression scores ranged from 2.4 (trace to slight) to 5.8 (severe) for overseeded and chemically treated turfs from 5 February to 5 March 2008. After that, height suppression was minimal, as all turfs ranged from 1.2 to 2.0 (essentially none to slight), which were no different from that of the UTC (1.2) on 29 March, 2008 (Table 7). The greatest amount of height suppression occurred for the high rate of Legacy, which had mean suppression scores of 5.2, 5.8, and 5.4 for the 30 day period from 5 February to 5 March, 2008 during the peak flowering period of the AB. The suppression scores were essentially linear with applied rate of Legacy in overseed turf. In that same 30 day period, both the tank mix of Legacy plus Cutless and Cutless alone generally caused growth suppression greater than the middle rate of just Legacy, but never as much suppression as the high rate of Legacy alone (Table 7).

In non-overseeded turf, the Cutless alone applied at 16 oz/product/acre had the greatest height suppression on 5 February (5.2), with the tank mix and the high rate of Legacy following (4.8 and 4.6 suppression mean values, respectively) (Table 7). After that, the high rate of Legacy ranked numerically first for height suppression. From 5

February to 29 March 2008, the rate response of Legacy was positive and linear with the active ingredient amount for height suppression on non-overseeded turf.

*The degree of flower head suppression* was assigned to plots using the same subjective scores scales as for “straw” and “height” suppression. Higher values (up to 6.0) indicate increasing to complete flower head suppression. Low values 1.0 to 2.0 represent none or slight suppression. The treatments affected flower head suppression on all four dates of evaluations from 5 March to 3 May 2008 for overseeded turf. Maximum suppression was achieved from the high application rate of Legacy (29.4 oz/product/acre) which had mean suppression scores of 6.0, 5.0, and 5.2, for 5 March, 29 March, and 17 April 2008, respectively on overseeded turf (Table 8). The response of flower head suppression Legacy was linear with rate, but both of the two lower rates had no more seed head suppression than that of the UTC on April 17 and 3 May 2008, which was past the peak flowering period (Table 8).

The tank mix of Legacy plus Cutless produced the next greatest seed head suppression, being more pronounced in early and late March. Primo alone caused some initial suppression (3.4) on 5 February 2008, which was short lived. Cutless alone caused initial seed head suppression on 5 March 2008, which lasted until the end of March (3.4), which then eroded completely (Table 8).

On non overseeded turf, treatments did affect flower head suppression on three of four evaluation, with the exception of 3 May 2008, which was after the peak flower period. On 5 March 2008, the high rate of Legacy had almost complete flower head suppression (5.2), with Cutless alone having the least (2.8) (Table 8). The response for Legacy was linear and rate dependent on 5 March 2008. On 29 March (end of peak flowering), only Legacy at the high rate had slight/moderate levels of flower head suppression (3.0). All other treatments had a breakdown of flower head suppression by 29 March. The high rate of Legacy did relinquish its flower head suppression, but it occurred a few weeks later than that of the other treatments (Table 8). Any remnant plants were flowering unrestricted by early May regardless of treatment (Table 8).

Poa annua Infestation and Control:

*Infestation Levels.*

Untreated turfs (UTC) infestation levels progressed from 17% to 61% plot cover from 27 November, to 17 April 2008 when overseeded, and from 32% to 98% from 13 November to 29 March 2008 for non-overseeded turfs, respectively (Table 9).

*Among the overseeded* and chemically treated turfs, the high rate of Legacy had the least amount of actual AB plot cover, usually averaging 5% or less from 27 November to 29 March 2008. At the close of the test, it had 17% AB cover, while other herbicide treated and overseeded turfs had 24 % to 39% AB cover (Table 9). For Legacy treated turfs, the reduction in actual amounts of *Poa* was essentially linear with applied rates, starting in early January and

afterwards. The low rate Legacy and Cutless tank mix essentially ranked second numerically for actual AB infestation levels. For AB infestation levels throughout the test, starting in early December (T9), Primo alone had only a slight effect, similar to that of Legacy at the low rate of 14.7 oz/product/acre (Table 9). Cutless alone had infestation levels close to that of Legacy treatments early on, which were then similar to that of the “moderate” rate of Legacy afterwards. Likewise, the Primo alone and Cutless alone treatments had near identical AB infestation levels. These two treatments ranged from 8% to 26% AB plot cover throughout the season, with both 39% AB cover at the end of the test on 17 April, 2008.

*When not overseeded*, the AB infestation levels were much greater, since these products do not have pre-emergence activity and were applied first in late October after AB emergence had initially started. The low and medium rate of Legacy had essentially the same amount of *Poa* cover as the UTC (32% to 98% as the season progressed) (Table 9). This was also true for the tank mix, Primo alone, and for Cutless alone. These treatments had nearly identical AB cover and were within 10% actual AB cover of the UTC when not overseeded (Table 9).

#### *Percent Weed Control:*

Percent weed control of AB *for overseeded turfs* ranged from 17% to 93% among treated turfs across all dates from 27 November 2007 to 17 April, 2008. There were differences between treatments for weed control on six of eight evaluation dates for weed control on overseeded turfs (Table 10). Legacy at the high rate had the greatest amount of weed control, with 80-90% control from 5 February to 17 April 2008. Early on, both the low and medium rates of Legacy had equal or slightly greater amounts of weed control than that of the high rate (27 November, 5 December, and 2 January). After that, percent weed control decreased quickly from 16 February to 17 April 2008 for these two Legacy treatments (Table 10).

The tank mix comprised of the low rate Legacy plus Cutless @ 8 oz/product/acre provided only modest control, ranging from 17% to 80% control throughout the test. This treatment was generally second to that of the high rate of Legacy (Table 10). Cutless alone @ 16 oz/product/acre had 20% to 50% greater control on overseeded turfs than that of Primo alone. Still, Cutless alone did not reach the weed control level the tank mix or the right rate of Legacy.

*For non-overseeded turf*, percent weed control was much lower in the absence of ryegrass competition. All treatments had 20% or less weed control, with the exception of Legacy, which had a maximum of 47% AB weed control on 5 December 2007, which decreased to 15% and then to 22% afterwards (Table 10).

The direct effect of overseeding itself is provided in Figure 3. Values indicate the amount of suppression from overseeding alone using the formula  $1 - (\text{infestation level of overseed control} / \text{infestation level of non-overseeded control}) \times 100$ . This was done using respective UTC means on each of the seven evaluation dates. Overseeding decreased *Poa annua* infestation levels from 45% to 77% throughout the season.

*Percentage of existing AB in Flower:*

This variable represents the amount of the total existing *Poa*, that is in flower. The value is independent of the actual total amount of AB present on a plot cover basis. For example, a plot could have 40% AB cover, with 20% AB cover in flower; while another plot may have 10% cover, and 5% AB cover in flower. Both of these plots would have a numerical value of 50% of AB in flower. The percent of existing *Poa* in flower for the overseed controls ranged from 16% in mid February, to a maximum of 55% by late March 2008, then decreasing after the peak of flowering to 14% on 17 April, 2008 (Figure 2).

*For overseeded turf*, the treatment effect was significant on overseeded turf on two of four evaluation dates. The results of data collected on 16 February are probably not biologically meaningful, as only two treatments (low and medium rate of Legacy) had any of its AB in flower, 24% and 7%, respectively (Table 11). On 5 March 2008, the UTC had 50% of its AB population cover in flower, followed by a reduced rate of flowering as a function of increased application rate of Legacy (15%, 8%, and 1% flower heading, respectively) (Table 11). On 5 March, the tank mix, Cutless alone, and Primo alone treatments averaged from 2% to 8% flower head expression (Table 11).

During peak flowering (29 March 2008), all treated turfs released any growth suppression of retaining flower heads as all treated turfs had higher percentage of their AB that was in flower than that of the UTC (55% of AB in flower). All treated turfs thus essentially postponed the emergence of flower heads, compared to that of the UTC (Table 11). This would logically lead to “negative” flower head control (listed in Table 12). At the close of the test for all AB evaluations on 17 April 2008, the UTC had only 14% of its AB cover flowering, as it had flowered profusely starting in early March.

*For non-overseeded turfs*, the percentage of the existing AB in flower was only affected by treatments on one of three evaluation dates (5 March, 2008). On this date, the high rate of Legacy maintained initial flower suppression (5% in flower), followed by the tank mix (8% in flower) (Table 11). By 29 March, all treated turfs averaged between having 76% to 87% of their AB in flower, with the UTC having 93% of its AB in full floral regalia. After that, the AB soon became necrotic in completion of its life cycle.

*Flower Head Control:*

*Flower head “control”* was calculated by accounting for the percentage of AB in flower for each treatment, relative to the UTC turf.

Among overseeded turfs and for the brief period from February to early March, flower head control was 95% or greater for the high rate of Legacy (98%) and the tank mix (96%). All other treatments with the exclusion of the low

rate of Legacy had 83% to 89% seed head control. This was short lived, as the release of flower head suppression was lost by 29 March 2008, and treatments flowered profusely at the end of the trial on 17 April 2008, with many treatments having 1.5 to 3 times the amount of AB in flower, over that of the UTC (Table 12). The results in some cases were negative percent control values, as treated turfs had a higher percentage of their AB amounts in flower than that of the UTC. Therefore, these PGR treatments postponed flowering, noting that Legacy at the high rate *had the least amount of AB cover* with flowering being delayed.

Among non-overseed turfs, percent seed head control was highest from 16 February to 5 March 2008, when the high rate of Legacy had 90% and 86% seed head control, respectively. Seed head control was short lived, with most treatments averaging 7% to 19% seed head control by the end of March (Table 12).

#### Plot discontinuity (turf/ weed contrast):

The presence of AB in vegetative and especially in flower phase is highly noticeable to the lay person or golfer. Therefore, plots were rated on four dates with scores that reflect the degree of discontinuity within a plot. It is essentially a relative subject scale of the degree of visual “contrast” within a plot. The contrast arises from color differences between AB and the ryegrass and the inevitable seed head disturbance. A plot that is initially 98% AB is not discontinuous, since it’s essentially all AB. As it flowers, it provides its own discordance within the plot itself, which increases its discontinuity score value. Higher values indicate greater discordance or visual degree of “discontinuity”. The treatments did affect discontinuity on all four evaluation dates. Only Legacy at the high rate of 29.4 oz/product/acre had very low discontinuity scores, as even a golf course superintendent would find it difficult to show visual contrasts from two different grasses present (Table 13). All other treatments would be “noticeable” as having a discontinuous surface.

#### Spring Transition:

Percent plot bermudagrass was affected by treatments on only two of six evaluation dates from 3 May to 15 July, 2008. The percent bermudagrass on 21 May 2008 ranged from 7% to 15% , and while statistically significant, was of no biological importance . On 10 June 2008, Cutless alone and the tank mix of the low rate of Legacy plus Cutless @ 8.0 ounce/prod/acre had the least amount of bermudagrass ( 15%-16%) (Table 2). Best estimates of transition occurred on 30 June 2008, were treated overseeded turfs ranged from 58% to 80% bermudagrass cover. Surprisingly, the Primo treated plots had the most bermudagrass cover, knowing that Primo is extremely active on bermudagrass via foliar uptake. Since the last application was in April, there was most likely less than 8% bermudagrass present (Table 2). On 3 July 2008, the turf was scalped from 1.25 to 0.5 inches to promote a full transition, resulting in less bermudagrass cover by 15 July 2008 (last rating).

## Conclusions

1. Chemical product applications did not affect emergence and treatments containing the formulated product of Legacy showed no inhibition. All treatments had enhanced turfgrass color over the UTC throughout all eight months of the test.
2. The high rate of Legacy exhibited a brief decrease in density, color and quality from late November and into December.
3. The high rate of Legacy produced the least amount of *Poa annua* cover, the greatest unmowed height suppression, the greatest seed head suppression and the greatest vegetative weed control of all treatments, and produced the least discontinuous surface.
4. Unmowed height suppression of *Poa annua* was linear with application rate of Legacy, noting that from 5 Feb to 5 March 2008, both the tank mix of Legacy plus Cutless and Cutless alone generally caused growth suppression greater than the middle rate of just Legacy, but never as much suppression as the high rate of Legacy alone.
5. Cutless alone produced similar turf and *Poa annua* effects as the tank mix of Legacy at the low rate plus the inclusion of Cutless at 8.0 oz /prod/acre.
6. The high rate of Legacy did not eliminate flowering, but postponed flowering of *Poa annua* well past the flushes of the UTC, noting that there was much less Poa present from this treatment when overseeded.
7. For seed head suppression, (after Legacy at the high rate) Primo alone caused some initial suppression on 5 February 2008, which was short lived.
8. Cutless alone caused initial seed head suppression on 5 March 2008, which lasted until the end of March, which then eroded completely.
9. The tank mix comprised of the low rate Legacy plus Cutless @ 8 oz/product/acre provided only modest *Poa annua* weed control, ranging from 17% to 80% control throughout the test. This treatment was generally second to that of the high rate of Legacy.
10. Cutless alone @ 16 oz/product/acre had 20% to 50% greater control on overseeded turfs (in comparison) to that of Primo alone. Still, Cutless alone did not reach the weed control levels of the tank mix or the high rate of Legacy.

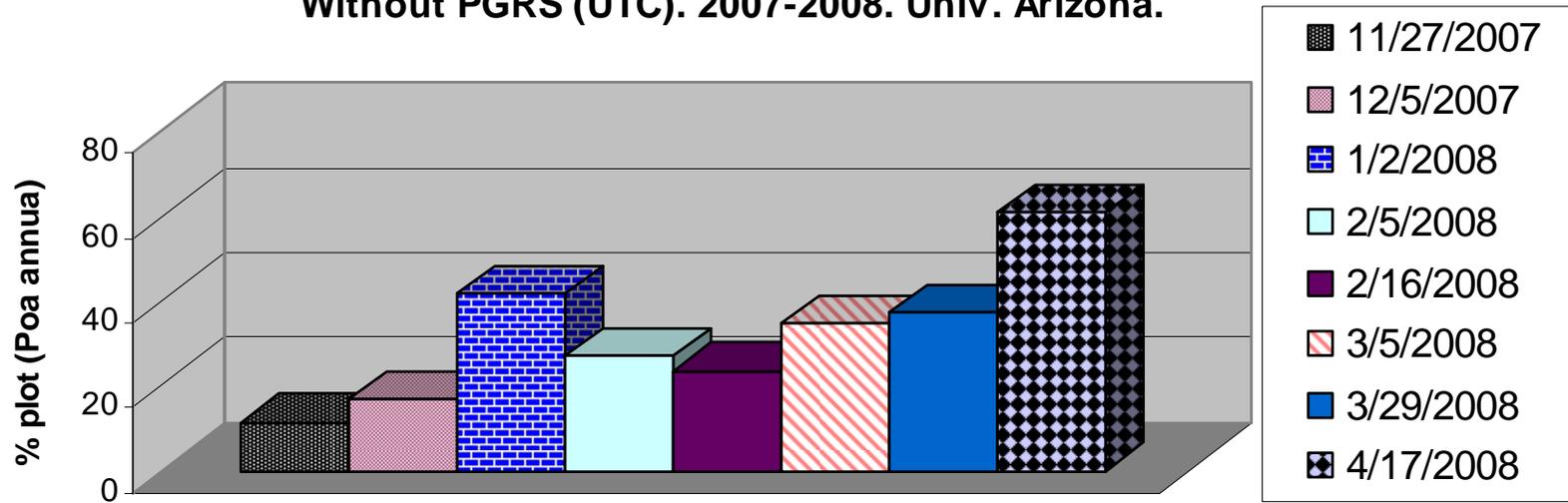
11. Primo Maxx alone caused minimal seed head suppression of *Poa annua*, and minimal weed control of total *Poa* cover and minimal control of *Poa* seed heads.
  
12. Since the medium rate of Legacy produced similar *Poa* activity effects with better turf quality after overseeding (but then decreased in *Poa* activity afterwards), applications of the medium rate from initial overseed followed by subsequent applications at the high rate starting in January should be investigated for economic, turf performance and weed control performance.

TEXT: FN: Sepro report text.doc Q 3 08 Gateway . RES REP Sepro folder. Text includes 3 figures as pictures.

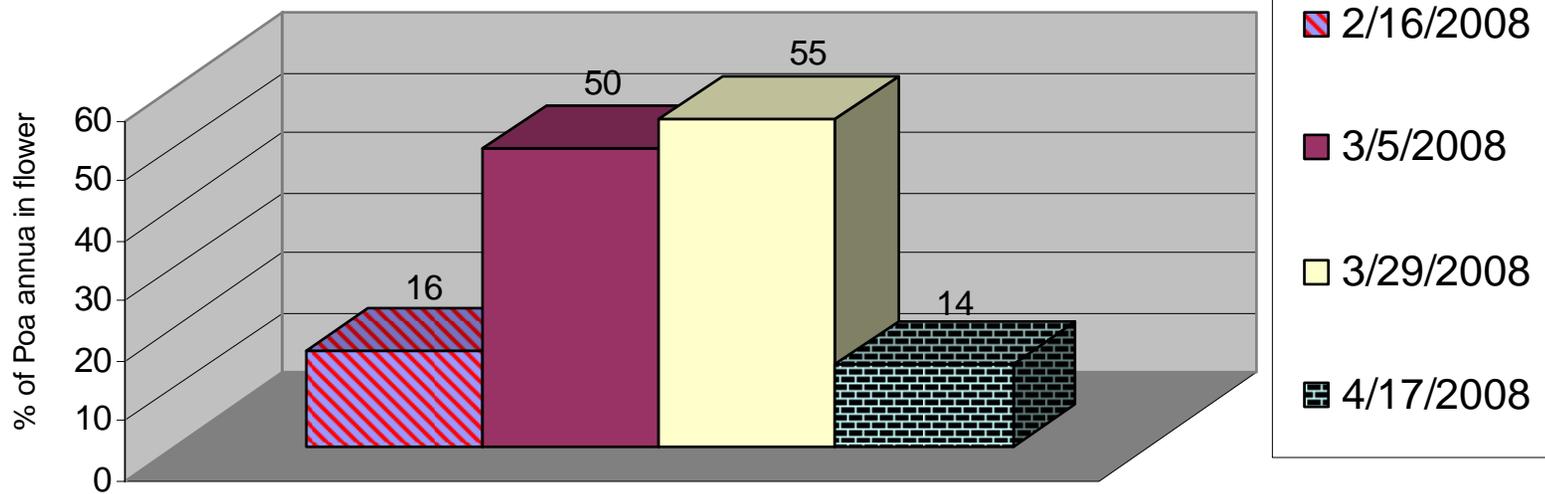
TABLES & FIGS: SEPRO0708.xls and SEPRO0708 for readers.xls. RES REP SEPRO 0708 folder on Q 3 08 Gateway.

*Key Search words: SP 5075 SP5075 Legacy Primo Cutless Poa annua POAANNUA annual blurgrass post emergence Green Valley Green Valley CC Bunnell Todd Bunnell flurprimidol trinexapacethyl cimectcarb. 2008 2008*

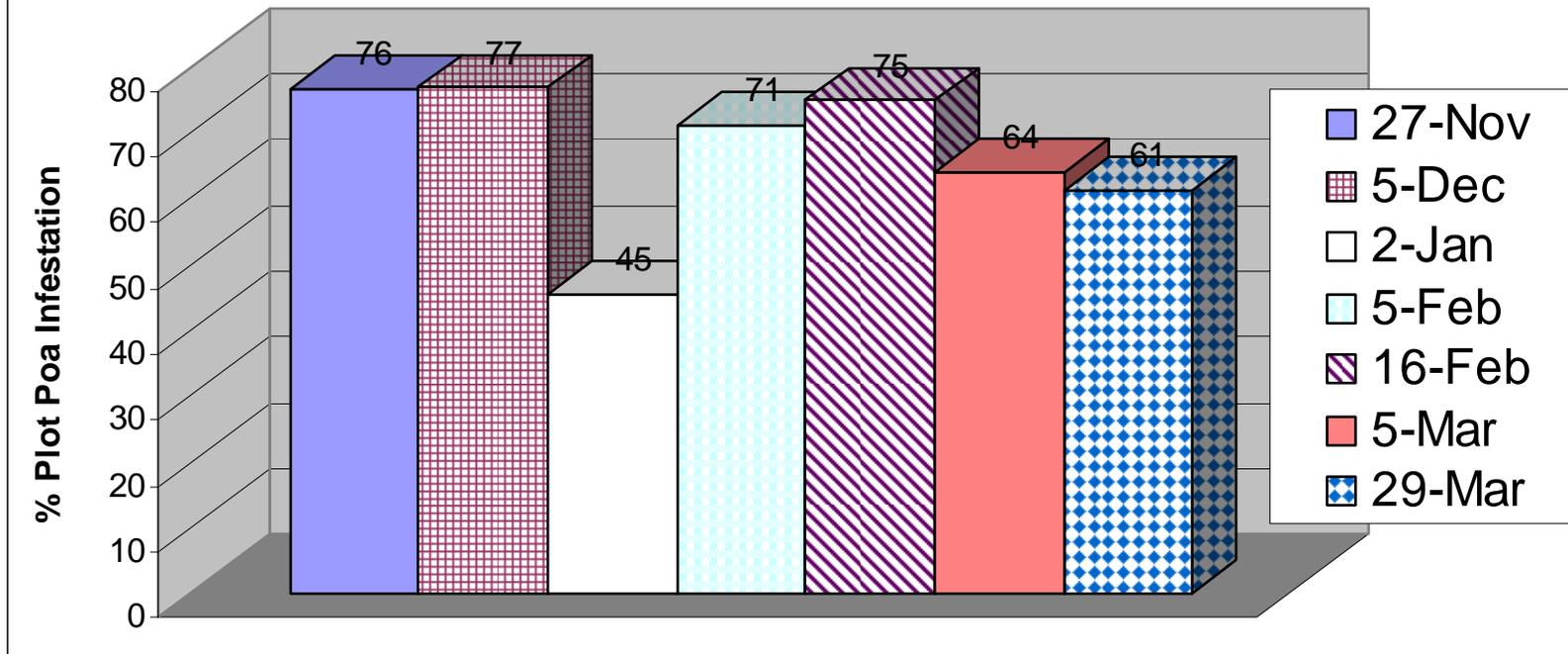
**Figure 1. Amount of (AB) plot cover in Overseeded Bermudagrass Without PGRS (UTC). 2007-2008. Univ. Arizona.**



**Figure 2. Percent of Existing *Poa annua* in flower in Overseeded bermudagrass and no PGR (UTC). 2007-2008. Univ. Arizona.**



**Fig. 3. Effect of Overseeding Alone on Percent *Poa annua* Infestation Levels, SePro Test, 2007 - 2008. Univ Az.**



**Table 1. Mean percent perennial ryegrass and straw plot cover of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed status	Treatment	% ryegrass			% straw cover					
		11/13/2007	11/27/2007	7/15/2008	11/13/2007	11/27/2007	2/5/2008	5/3/2008	5/21/2008	7/15/2008
rye=yes	UTC	96	76	22	0	5	2	18	.	22
rye=yes	Legacy@14.7oz	97	89	29	0	2	0	15	.	20
rye=yes	Legacy@22.1oz	96	81	24	0	4	1	10	.	14
rye=yes	Legacy@29.4oz	96	81	29	0	7	4	5	.	39
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	94	80	38	0	3	3	9	.	25
rye=yes	Primo Maxx@22oz	99	82	14	0	3	1	8	.	18
rye=yes	Cutl.@16oz	92	76	43	0	3	8	10	.	32
<b>test mean</b>		<b>96</b>	<b>81</b>	<b>28</b>	<b>0</b>	<b>4</b>	<b>3</b>	<b>11</b>	<b>.</b>	<b>24</b>
<b>LSD</b>		<b>ns</b>	<b>7</b>	<b>15</b>	<b>ns</b>	<b>2</b>	<b>3</b>	<b>ns</b>	<b>NA</b>	<b>ns</b>
rye=No	UTC	.	.	3	38	39	.	31	21	29
rye=No	Legacy@14.7oz	.	.	3	51	30	.	59	12	30
rye=No	Legacy@22.1oz	.	.	1	52	40	.	57	7	12
rye=No	Legacy@29.4oz	.	.	0	51	61	.	73	15	32
rye=No	Legacy@14.7oz+Cutl.@8.0oz	.	.	1	56	36	.	72	16	23
rye=No	Primo Maxx@22oz	.	.	0	37	30	.	54	8	10
rye=No	Cutl.@16oz	.	.	0	51	36	.	74	18	18
<b>test mean</b>		<b>.</b>	<b>.</b>	<b>1</b>	<b>48</b>	<b>39</b>	<b>.</b>	<b>60</b>	<b>14</b>	<b>22</b>
<b>LSD</b>		<b>NA</b>	<b>NA</b>	<b>ns</b>	<b>ns</b>	<b>18</b>	<b>NA</b>	<b>21</b>	<b>ns</b>	<b>ns</b>

% of plot cover of perennial ryegrass or straw turf cover (0%- 100%). Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 2. Mean percent bermudagrass plot cover of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed status	Treatment	% plot bermudagrass cover							
		11/13/2007	11/27/2007	5/3/2008	5/21/2008	6/10/2008	6/20/2008	6/30/2008	7/15/2008
rye=yes	UTC	4	8	6	9	27	46	84	56
rye=yes	Legacy@14.7oz	3	5	6	10	15	38	76	51
rye=yes	Legacy@22.1oz	4	11	6	12	25	47	69	62
rye=yes	Legacy@29.4oz	4	6	5	9	17	38	67	48
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	6	7	5	9	16	33	69	37
rye=yes	Primo Maxx@22oz	1	5	8	15	23	47	80	68
rye=yes	Cutl.@16oz	8	12	5	7	15	36	58	43
<b>test mean</b>		<b>4</b>	<b>8</b>	<b>6</b>	<b>10</b>	<b>20</b>	<b>41</b>	<b>72</b>	<b>52</b>
<b>LSD</b>		<b>ns</b>	<b>4</b>	<b>ns</b>	<b>5</b>	<b>8</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>
rye=No	UTC	30	10	11	77	86	100	94	86
rye=No	Legacy@14.7oz	16	8	13	86	79	96	91	85
rye=No	Legacy@22.1oz	18	9	17	90	94	98	97	87
rye=No	Legacy@29.4oz	26	11	10	72	68	97	94	85
rye=No	Legacy@14.7oz+Cutl.@8.0oz	19	12	11	79	89	95	96	76
rye=No	Primo Maxx@22oz	20	5	10	88	92	98	95	90
rye=No	Cutl.@16oz	21	13	17	76	89	94	96	82
<b>test mean</b>		<b>21</b>	<b>10</b>	<b>13</b>	<b>81</b>	<b>85</b>	<b>97</b>	<b>95</b>	<b>84</b>
<b>LSD</b>		<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>

Bermudagrass plot cover =(0%-100%) percentage of the plot showing bermudagrass. Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 3. Mean turgrass Density scores of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed status	Treatment	Density						
		11/13/2007	11/27/2007	12/5/2007	1/2/2008	2/16/2008	5/21/2008	6/10/2008
rye=yes	UTC	8.2	6.4	6.4	6.4	6.0	8.2	6.2
rye=yes	Legacy@14.7oz	7.6	6.8	6.6	6.8	7.4	7.8	7.2
rye=yes	Legacy@22.1oz	7.6	7.4	6.2	6.6	6.8	7.8	6.8
rye=yes	Legacy@29.4oz	7.0	5.6	5.2	5.4	6.2	8.0	7.2
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	7.8	6.4	6.6	6.2	6.6	7.8	7.0
rye=yes	Primo Maxx@22oz	7.8	7.2	6.4	7.0	6.8	8.4	6.4
rye=yes	Cutl.@16oz	7.8	6.2	6.6	6.6	5.8	7.6	6.8
<b>test mean</b>		<b>7.7</b>	<b>6.6</b>	<b>6.3</b>	<b>6.4</b>	<b>6.5</b>	<b>7.9</b>	<b>6.8</b>
<b>LSD</b>		<b>ns</b>	<b>1.2</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>
rye=No	UTC	.	.	.	.	7.6	6.6	5.6
rye=No	Legacy@14.7oz	.	.	.	.	7.6	6.6	5.0
rye=No	Legacy@22.1oz	.	.	.	.	7.0	6.2	6.2
rye=No	Legacy@29.4oz	.	.	.	.	5.8	5.0	5.0
rye=No	Legacy@14.7oz+Cutl.@8.0oz	.	.	.	.	6.2	5.2	6.0
rye=No	Primo Maxx@22oz	.	.	.	.	7.6	6.2	5.4
rye=No	Cutl.@16oz	.	.	.	.	4.8	4.8	5.2
<b>test mean</b>		<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>6.7</b>	<b>5.8</b>	<b>5.5</b>
<b>LSD</b>		<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>1.1</b>	<b>0.9</b>	<b>ns</b>

Turgrass Density. (1-9) 1= dead, 4=sparse, 5= marginal, 6= fully acceptable, 9= best possible. Values are the mean of 5 replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 4. Mean turgrass Color scores of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed status	Treatment	color											
		11/13	11/27	12/5	1/2	2/5	2/16	3/5	3/29	4/17	5/3	5/21	6/10
rye=yes	UTC	5.6	5.6	5.8	5.2	5.6	5.4	5.2	5.0	5.4	5.2	5.8	6.6
rye=yes	Legacy@14.7oz	6.8	6.6	6.4	5.8	6.4	6.2	6.6	6.0	5.8	6.2	6.2	7.4
rye=yes	Legacy@22.1oz	7.4	7.6	7.6	6.8	7.2	6.8	7.4	6.6	6.2	7.2	6.8	7.0
rye=yes	Legacy@29.4oz	6.6	6.8	5.6	5.0	7.4	7.6	7.6	7.0	7.0	6.4	7.2	7.4
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	6.8	6.6	6.4	6.4	7.4	7.0	7.2	6.6	6.8	6.4	7.2	7.4
rye=yes	Primo Maxx@22oz	7.4	6.8	6.8	6.6	5.8	5.6	6.6	6.6	6.0	7.2	6.6	6.6
rye=yes	Cutl.@16oz	6.4	6.0	6.6	6.2	6.4	5.6	7.6	7.0	6.0	6.4	8.2	7.8
<b>test mean</b>		<b>6.7</b>	<b>6.6</b>	<b>6.5</b>	<b>6.0</b>	<b>6.6</b>	<b>6.3</b>	<b>6.9</b>	<b>6.4</b>	<b>6.2</b>	<b>6.4</b>	<b>6.9</b>	<b>7.2</b>
<b>LSD</b>		<b>1.1</b>	<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>0.9</b>	<b>0.8</b>	<b>1.1</b>	<b>1.1</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.8</b>
rye=No	UTC	.	.	.	5.0	.	.	3.6	.	2.6	.	5.0	5.6
rye=No	Legacy@14.7oz	.	.	.	4.2	.	.	5.4	.	2.6	.	5.0	6.0
rye=No	Legacy@22.1oz	.	.	.	4.8	.	.	5.0	.	2.8	.	5.2	5.8
rye=No	Legacy@29.4oz	.	.	.	3.2	.	.	5.8	.	2.2	.	5.6	5.6
rye=No	Legacy@14.7oz+Cutl.@8.0oz	.	.	.	4.8	.	.	5.2	.	1.6	.	5.4	5.8
rye=No	Primo Maxx@22oz	.	.	.	4.4	.	.	4.6	.	2.4	.	5.2	6.4
rye=No	Cutl.@16oz	.	.	.	5.4	.	.	6.0	.	2.4	.	5.6	6.0
<b>test mean</b>		<b>.</b>	<b>.</b>	<b>.</b>	<b>4.5</b>	<b>.</b>	<b>.</b>	<b>5.1</b>	<b>.</b>	<b>2.4</b>	<b>.</b>	<b>5.3</b>	<b>5.9</b>
<b>LSD</b>		<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>1.2</b>	<b>NA</b>	<b>NA</b>	<b>1.0</b>	<b>NA</b>	<b>ns</b>	<b>NA</b>	<b>ns</b>	<b>ns</b>

Turgrass Color = (1-9) 1= dead, 4=pea green ,5=apple green, 6= med.green, 9= dark forest green. Values are the mean of 5 replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. a/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 5. Mean turgrass Quality scores of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed status	Treatment	Quality											
		11/13	11/27	12/5	1/2	2/5	2/16	3/5	3/29	4/17	5/3	5/21	6/10
rye=yes	UTC	8.0	6.0	6.4	6.2	6.6	5.8	4.8	4.2	4.4	5.0	7.0	6.4
rye=yes	Legacy@14.7oz	7.8	7.0	7.8	6.6	7.4	7.0	5.6	5.0	6.0	5.4	7.8	7.4
rye=yes	Legacy@22.1oz	8.2	6.8	6.6	6.4	7.4	7.2	6.6	5.4	6.0	5.8	7.6	6.8
rye=yes	Legacy@29.4oz	7.0	5.4	5.0	5.0	6.4	6.8	7.4	6.8	7.6	7.4	8.6	7.6
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	8.0	6.6	6.8	6.4	7.0	6.8	7.0	5.6	6.4	5.6	8.0	6.6
rye=yes	Primo Maxx@22oz	7.4	7.0	6.8	6.4	6.6	6.2	5.8	4.6	6.0	6.4	8.2	7.0
rye=yes	Cutl.@16oz	7.2	6.2	7.0	6.0	5.6	5.4	6.6	5.4	6.2	5.8	7.4	7.0
<b>test mean</b>		<b>7.7</b>	<b>6.4</b>	<b>6.6</b>	<b>6.1</b>	<b>6.7</b>	<b>6.5</b>	<b>6.3</b>	<b>5.3</b>	<b>6.1</b>	<b>5.9</b>	<b>7.8</b>	<b>7.0</b>
<b>LSD</b>		<b>0.8</b>	<b>ns</b>	<b>1.1</b>	<b>ns</b>	<b>ns</b>	<b>1.2</b>	<b>1.1</b>	<b>ns</b>	<b>1.2</b>	<b>1.1</b>	<b>ns</b>	<b>ns</b>
rye=No	UTC	.	.	.	.	.	.	6.2	.	.	.	6.0	6.2
rye=No	Legacy@14.7oz	.	.	.	.	.	.	5.8	.	.	.	6.0	5.4
rye=No	Legacy@22.1oz	.	.	.	.	.	.	4.4	.	.	.	5.6	6.0
rye=No	Legacy@29.4oz	.	.	.	.	.	.	3.4	.	.	.	5.0	6.0
rye=No	Legacy@14.7oz+Cutl.@8.0oz	.	.	.	.	.	.	4.8	.	.	.	5.0	6.0
rye=No	Primo Maxx@22oz	.	.	.	.	.	.	6.2	.	.	.	6.2	6.0
rye=No	Cutl.@16oz	.	.	.	.	.	.	4.2	.	.	.	4.6	5.6
<b>test mean</b>		<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>5.0</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>5.5</b>	<b>5.9</b>
<b>LSD</b>		<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>1.4</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>0.9</b>	<b>ns</b>

Turgrass Quality. (1-9) 1= dead, 4=poor, 5=marginal, 6= fully acceptable, 9= best possible. Values are the mean of 5 replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 6. Mean Poa annua stress score values of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed status	Treatment	Visual stress scores on Poa annua				
		12/5/2007	1/2/2008	2/16/2008	4/17/2008	5/3/2008
rye=yes	UTC	.	1.4	.	.	.
rye=yes	Legacy@14.7oz	.	1.6	.	.	.
rye=yes	Legacy@22.1oz	.	1.4	.	.	.
rye=yes	Legacy@29.4oz	.	3.4	.	.	.
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	.	2.0	.	.	.
rye=yes	Primo Maxx@22oz	.	1.6	.	.	.
rye=yes	Cutl.@16oz	.	1.4	.	.	.
<b>test mean</b>		.	1.8	.	.	.
<b>LSD</b>		NA	1.0	NA	NA	NA
rye=No	UTC	3.9	1.0	4.1	5.0	4.3
rye=No	Legacy@14.7oz	4.4	2.0	4.0	5.1	5.1
rye=No	Legacy@22.1oz	4.3	2.0	3.6	5.5	5.4
rye=No	Legacy@29.4oz	3.8	3.8	3.1	5.6	5.8
rye=No	Legacy@14.7oz+Cutl.@8.0oz	3.9	2.2	3.1	5.1	5.5
rye=No	Primo Maxx@22oz	4.5	2.0	4.1	5.1	4.8
rye=No	Cutl.@16oz	3.5	1.2	2.9	5.6	5.8
<b>test mean</b>		4.0	2.0	3.6	5.3	5.2
<b>LSD</b>		0.7	0.8	0.4	ns	0.8

Poa annua visual stress. (1-6) : 1= none, 3= slite/mod. 4= moderate, 5=mod. to severe, 6 = severe or extreme stress

Stress is a visual compilation of color, stunting, any leaf twisting, general vigor and or necrosis.

Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 7. Mean Poa annua height suppression scores on overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed		Poa annua height suppression scores.				
<u>status</u>	Treatment	12/5/2007	2/5/2008	2/16/2008	3/5/2008	3/29/2008
rye=yes	UTC	.	2.8	2.2	1.0	1.2
rye=yes	Legacy@14.7oz	.	2.4	3.0	2.6	1.2
rye=yes	Legacy@22.1oz	.	2.8	3.8	3.2	2.0
rye=yes	Legacy@29.4oz	.	5.2	5.8	5.4	1.6
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	.	4.0	4.2	4.8	2.0
rye=yes	Primo Maxx@22oz	.	2.0	2.0	2.2	1.8
rye=yes	Cutl.@16oz	.	5.0	4.6	3.6	1.4
<b>test mean</b>		.	3.5	3.7	3.3	1.6
<b>LSD</b>		NA	1.7	1.5	1.5	ns
rye=No	UTC	5.6	1.4	1.2	1.2	1.2
rye=No	Legacy@14.7oz	4.0	2.6	2.4	2.8	2.6
rye=No	Legacy@22.1oz	3.2	3.4	3.0	3.6	3.2
rye=No	Legacy@29.4oz	2.4	4.6	4.0	5.0	4.4
rye=No	Legacy@14.7oz+Cutl.@8.0oz	3.4	4.8	3.8	3.8	3.6
rye=No	Primo Maxx@22oz	4.2	1.2	1.4	2.6	2.2
rye=No	Cutl.@16oz	4.8	5.2	3.8	3.0	2.2
<b>test mean</b>		3.9	3.3	2.8	3.1	2.8
<b>LSD</b>		1.3	0.8	1.0	0.7	1.5

Poa annua visual height suppression. (1-6) : 1= none, 4= moderate suppression, 6 = severe or extreme height suppression.

Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if their difference is greater than the LSD value.

**Table 8. Mean Poa annua flower head suppression scores of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

<u>Overseed status</u>	<u>Treatment</u>	<u>flower head suppression</u>			
		<u>3/5/2008</u>	<u>3/29/2008</u>	<u>4/17/2008</u>	<u>5/3/2008</u>
<b>rye=yes</b>	UTC	1.4	2.2	2.8	2.6
<b>rye=yes</b>	Legacy@14.7oz	3.8	2.8	2.6	2.4
<b>rye=yes</b>	Legacy@22.1oz	4.8	3.0	2.8	2.8
<b>rye=yes</b>	Legacy@29.4oz	6.0	5.0	5.2	4.4
<b>rye=yes</b>	Legacy@14.7oz+Cutl.@8.0oz	5.6	3.8	2.8	3.0
<b>rye=yes</b>	Primo Maxx@22oz	3.4	2.6	2.0	2.6
<b>rye=yes</b>	Cutl.@16oz	3.8	3.4	2.6	3.2
<b>test mean</b>		4.1	3.3	3.0	3.0
<b>LSD</b>		1.1	1.0	1.8	1.3
<b>rye=No</b>	UTC	1.2	1.0	2.4	1.2
<b>rye=No</b>	Legacy@14.7oz	3.4	1.4	2.4	1.2
<b>rye=No</b>	Legacy@22.1oz	3.6	1.8	1.4	1.4
<b>rye=No</b>	Legacy@29.4oz	5.2	3.0	2.6	1.4
<b>rye=No</b>	Legacy@14.7oz+Cutl.@8.0oz	3.4	1.8	1.6	1.2
<b>rye=No</b>	Primo Maxx@22oz	4.0	1.0	1.2	1.0
<b>rye=No</b>	Cutl.@16oz	2.8	2.0	1.4	1.2
<b>test mean</b>		3.4	1.7	1.9	1.2
<b>LSD</b>		1.5	0.9	1.1	ns

Flower head suppression scores. (1-6): 1= no suppression, 4= moderate suppression, 6 = complete suppression.

Amount of Poa present is not considered. Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 9. Mean percent *Poa annua* plot cover of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed status	Treatment	%Poa annua infestation								
		11/13/2007	11/27/2007	12/5/2007	1/2/2008	2/5/2008	2/16/2008	3/5/2008	3/29/2008	4/17/2008
rye=yes	UTC	.	12	17	42	27	24	35	38	61
rye=yes	Legacy@14.7oz	.	4	6	18	24	16	27	25	32
rye=yes	Legacy@22.1oz	.	4	6	12	13	14	17	16	24
rye=yes	Legacy@29.4oz	.	6	5	6	5	5	5	3	17
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	.	10	11	16	9	10	10	7	25
rye=yes	Primo Maxx@22oz	.	10	11	26	24	19	27	21	39
rye=yes	Cutl.@16oz	.	8	10	13	12	16	12	13	39
<b>test mean</b>		.	8	9	19	16	15	19	18	34
<b>LSD</b>		NA	5	ns	12	15	11	12	22	18
rye=No	UTC	32	51	73	77	93	95	97	98	.
rye=No	Legacy@14.7oz	33	62	74	84	93	97	98	98	.
rye=No	Legacy@22.1oz	30	51	59	73	93	94	92	96	.
rye=No	Legacy@29.4oz	24	28	39	52	79	76	76	77	.
rye=No	Legacy@14.7oz+Cutl.@8.0oz	25	52	63	80	87	92	93	96	.
rye=No	Primo Maxx@22oz	43	65	76	86	96	98	98	98	.
rye=No	Cutl.@16oz	28	51	69	81	78	85	91	94	.
<b>test mean</b>		31	51	65	76	89	91	92	94	.
<b>LSD</b>		ns	21	20	20	10	10	7	9	NA

% of *Poa annua* cover of the entire plot surface. (0%- 100%). Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 10. Mean Poa annua weed control values of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

		Percent weed control of Poa annua,								
<b>Overseed status</b>	<b>Treatment</b>	<b>11/13/2007</b>	<b>11/27/2007</b>	<b>12/5/2007</b>	<b>1/2/2008</b>	<b>2/5/2008</b>	<b>2/16/2008</b>	<b>3/5/2008</b>	<b>3/29/2008</b>	<b>4/17/2008</b>
rye=yes	UTC	.	NA	NA	NA	NA	NA	NA	NA	NA
rye=yes	Legacy@14.7oz	.	62	67	55	14	31	23	34	48
rye=yes	Legacy@22.1oz	.	62	62	50	53	42	51	57	61
rye=yes	Legacy@29.4oz	.	52	71	52	82	81	85	93	73
rye=yes	Legacy@14.7oz+Cutl.@8.0oz	.	17	38	62	66	57	71	80	59
rye=yes	Primo Maxx@22oz	.	14	38	38	12	21	23	45	36
rye=yes	Cutl.@16oz	.	29	41	69	58	32	66	65	37
<b>test mean</b>		.	39	53	54	48	44	53	63	52
<b>LSD</b>		NA	35	ns	ns	39	38	27	37	26
rye=No	UTC	NA	NA	NA	NA	NA	NA	NA	NA	.
rye=No	Legacy@14.7oz	-3	-22	-1	-9	0	-2	-1	0	.
rye=No	Legacy@22.1oz	5	0	19	5	0	1	5	2	.
rye=No	Legacy@29.4oz	25	45	47	33	15	20	22	21	.
rye=No	Legacy@14.7oz+Cutl.@8.0oz	21	-2	14	-4	7	3	4	2	.
rye=No	Primo Maxx@22oz	-36	-28	-4	-12	-3	-3	-1	0	.
rye=No	Cutl.@16oz	11	0	6	-5	16	11	6	5	.
<b>test mean</b>		4	-1	13	1	6	5	6	5	.
<b>LSD</b>		ns	36	29	22	10	11	8	10	NA

% Weed control of Poa annua. (0%- 100%). From the equation  $1 - (\text{treatment} / \text{UTC}) * 100$ . Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 11. Mean percent of existing Poa annua "in flower" of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

<b>Overseed status</b>	<b>Treatment</b>	<b>% of the existing Poa in flower.</b>			
		<b>2/16/2008</b>	<b>3/5/2008</b>	<b>3/29/2008</b>	<b>4/17/2008</b>
<b>rye=yes</b>	UTC	16	50	55	14
<b>rye=yes</b>	Legacy@14.7oz	24	15	63	33
<b>rye=yes</b>	Legacy@22.1oz	7	8	78	66
<b>rye=yes</b>	Legacy@29.4oz	0	1	67	14
<b>rye=yes</b>	Legacy@14.7oz+Cutl.@8.0oz	0	2	74	40
<b>rye=yes</b>	Primo Maxx@22oz	6	8	64	35
<b>rye=yes</b>	Cutl.@16oz	0	5	61	42
<b>test mean</b>		6	13	66	35
<b>LSD</b>		ns	11	ns	28
<b>rye=No</b>	UTC	7	35	93	.
<b>rye=No</b>	Legacy@14.7oz	3	15	77	.
<b>rye=No</b>	Legacy@22.1oz	4	15	76	.
<b>rye=No</b>	Legacy@29.4oz	1	5	75	.
<b>rye=No</b>	Legacy@14.7oz+Cutl.@8.0oz	2	8	78	.
<b>rye=No</b>	Primo Maxx@22oz	3	11	87	.
<b>rye=No</b>	Cutl.@16oz	6	17	82	.
<b>test mean</b>		3	15	81	.
<b>LSD</b>		ns	13	ns	NA

% of Poa annua in flower = Amount of the existing Poa annua cover itself that is in flower.

Total amount of Poa plot cover is irrelevant.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 12. Mean Percent seed head control values of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

Overseed		% Flower seed head control			
status	Treatment	2/16/2008	3/5/2008	3/29/2008	4/17/2008
rye=yes	UTC	NA	NA	NA	NA
rye=yes	Legacy @14.7oz	-46	70	-15	-128
rye=yes	Legacy @22.1oz	55	82	-43	-356
rye=yes	Legacy @29.4oz	100	97	-21	2
rye=yes	Legacy @14.7oz+Cutl. @8.0oz	100	95	-35	-176
rye=yes	Primo Maxx @22oz	64	83	-17	-143
rye=yes	Cutl. @16oz	100	88	-12	191
<b>test mean</b>		<b>62</b>	<b>86</b>	<b>-24</b>	<b>-165</b>
<b>LSD</b>		<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>211</b>
<hr/>					
rye=No	UTC	NA	NA	NA	.
rye=No	Legacy @14.7oz	59	57	17	.
rye=No	Legacy @22.1oz	46	57	18	.
rye=No	Legacy @29.4oz	90	86	19	.
rye=No	Legacy @14.7oz+Cutl. @8.0oz	64	76	16	.
rye=No	Primo Maxx @22oz	60	67	7	.
rye=No	Cutl. @16oz	16	51	12	.
<b>test mean</b>		<b>56</b>	<b>66</b>	<b>15</b>	<b>.</b>
<b>LSD</b>		<b>ns</b>	<b>ns</b>	<b>ns</b>	<b>NA</b>

% Seed head control. = amount of the existing Poa cover which is flowering relative to the entire

Poa annua plot cover on a per plot basis. Then used in the equation  $1 - (\text{treatment} / \text{UTC}) * 100$  to produce values above.

Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.

**Table 13. Mean Discontinuity scores of overseeded and non-overseeded bermudagrass turf after monthly applications of selected PGR treatments from October 2007 to April 2008. University of Arizona.**

<b>Overseed status</b>	<b>Treatment</b>	<b>discontinuity</b>			
		<b>3/11/2008</b>	<b>3/29/2008</b>	<b>4/17/2008</b>	<b>5/3/2008</b>
<b>rye=yes</b>	UTC	4.8	5.2	4.6	3.0
<b>rye=yes</b>	Legacy@14.7oz	3.6	4.6	4.2	3.0
<b>rye=yes</b>	Legacy@22.1oz	2.8	3.8	3.6	2.4
<b>rye=yes</b>	Legacy@29.4oz	1.4	1.6	1.8	1.4
<b>rye=yes</b>	Legacy@14.7oz+Cutl.@8.0oz	2.0	2.8	3.6	2.4
<b>rye=yes</b>	Primo Maxx@22oz	4.2	4.4	4.0	2.4
<b>rye=yes</b>	Cutl.@16oz	2.4	3.2	3.8	2.0
<b>test mean</b>		<b>3.0</b>	<b>3.7</b>	<b>3.7</b>	<b>2.4</b>
<b>LSD</b>		<b>1.4</b>	<b>1.4</b>	<b>1.6</b>	<b>1.0</b>
<b>rye=No</b>	UTC	.	.	.	.
<b>rye=No</b>	Legacy@14.7oz	.	.	.	.
<b>rye=No</b>	Legacy@22.1oz	.	.	.	.
<b>rye=No</b>	Legacy@29.4oz	.	.	.	.
<b>rye=No</b>	Legacy@14.7oz+Cutl.@8.0oz	.	.	.	.
<b>rye=No</b>	Primo Maxx@22oz	.	.	.	.
<b>rye=No</b>	Cutl.@16oz	.	.	.	.
<b>test mean</b>		.	.	.	.
<b>LSD</b>		<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

Discontinuity. (1-6) : 1= none, 4= moderate discontinuity, 6 = severe or extreme visual discontinuity apparent.

Values are the mean of five replications.

Overseed status= Rye yes =overseeded Oct 1, 2008 @ 625 lbs. ai/a. No = no overseeding practiced.

Treatments applied once monthly, Oct, Nov, Dec, Jan, Feb, Mar, April. UTC=untreated control.

Test mean =mean of all treatments and UTC

LSD Value. = Treatment mean separations statistic. Treatments which differ in their mean performance values are statistically different from each other if that difference is greater than the LSD value.